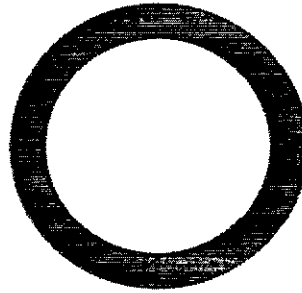


City of Minneapolis

Street Lighting Design

#11

Orfield Laboratories Inc



Design Research Testing

Acoustics / Vibration / Vision / Lighting / Architecture / Market Research

PREPARED FOR

City of Minneapolis
Dan Niziolek
3101 Nicolett Ave S.
Minneapolis, MN
Phone: (612) 673-2824
E-Mail: daniel.niziolek@ci.minneapolis

PROJECT

City of Minneapolis Residential Street Lighting Program

PREPARED BY

Mr. Steven Orfield, President
Orfield Laboratories, Inc.
2709 East 25th Street
Minneapolis, MN 55406

The following proposal for the performance of professional consulting services is being issued in a coordinated effort with the Transportation Division of Minneapolis. This effort is intended to develop new street lighting standards for pedestrian level lighting and to use citizens and scientific measurement to validate both user preference and lighting performance. This project will include a meeting at Orfield Laboratories with all manufacturers involved.





INTRODUCTION

The Transportation Division of the City of Minneapolis, has in place a process to qualify and approve pedestrian-level fixtures to be used along the residential streets throughout of the City. In meetings with Orfield Laboratories, Inc., also of Minneapolis, they have expressed an interest in determining the lighting system or systems that evoke positive responses from residents, law enforcement officers, and visitors to the City's residential areas. The Transportation Division has decided to work with Orfield Laboratories to develop a lighting standard for fixtures that the Transportation Division can measure candidate lighting systems against. This program of investigation is a collaboration with Orfield Laboratories, an independent lighting lab, to a select residential street lighting manufacturers and products to address this interest of the Transportation Division in these matters.

PROGRAM INTENT

The intent of this program of investigation and research is to address important issues regarding pedestrian-level street lighting systems in residential areas, to include:

- Lighting Quality within residential environments
- Consumer preference for particular lighting characteristics
- Standardization and qualification of lighting systems for the Transportation Division to aid installation of uniformly high-quality lighting
- Consumer-grounded feedback to the manufacturers on lighting systems within their product lines
- Quantitative assessment of light production by candidate lighting systems and their impact on visibility and glare within the residential environment
- Cost of product and operating and maintenance cost

DESIGN ISSUES & PROJECT APPROACH

Orfield Laboratories' project will include the following phases in order to lay a foundation for design, development and execution of lighting systems within the City.

The proposal consists of three phases each divided into a series of segments. The first phase surveys the current national state of the art of pedestrian street lighting, including preferred styles of lighting. The second phase assesses selected current lighting systems, develops a standard for lighting manufacturers and completes initial testing of manufacturer's fixture submissions. The third phase includes additional testing, acceptance of systems and a final consumer jury.



PHASE I: PRELIMINARY DEVELOPMENT - SITE VISITS

Various neighborhoods and locations within the Minneapolis area are surveyed by Orfield Laboratory (OL) and Transportation Division staff in this segment. Measurements of the illumination level, its consistency, and factors that affect visibility of various locations within these sites will be made.

LITERATURE AND PRODUCT REVIEW

Relevant literature in the fields of lighting, psychology, human factors, and urban design, among others, is reviewed by the OL and Transportation Division staff. Product literature from the participating manufacturers and standards definitions related to relevant product lines are also surveyed.

CONSUMER JURY #1: STYLE

This segment investigates the response of demographically-selected jurors to various styles of residential lighting fixtures and placements. Using simulation and visualization to generate renderings of various designs, the attributes of lighting systems defining the envelope of positive viewer response are investigated. This investigation follows the Perceptual Market Research™ approach pioneered by Orfield Laboratories as well as other jury-related activities within this program. Jurors will be selected from a pool of residents of the City, law enforcement, City professional & technical staff, and City business community members. Non-City residents may also be used.

PHASE II: INTERMEDIATE TESTING AND ASSESSMENT

FIELD JURY OF EXISTING INSTALLATIONS

This segment brings a demographically-selected jury of observers to selected locations within sites in the City of Minneapolis. At each location, the semantic-differential response of each juror will be measured and quantitative measurements of the scene-as-viewed will be made.

ANALYSIS AND ASSESSMENT

Once the field jury measurements have been made in the first segment of this phase, the data are analyzed for correlations between subjective juror responses and physical attributes of the scene when measured quantitatively.

DEVELOPMENT OF RESIDENTIAL LIGHTING STANDARD

After the correlates to positive subjective juror response have been exposed in the last segment, standards for lighting fixtures, light sources, placement and cost of installation along with operation and maintenance costs will be developed in this segment of the program. Concurrent with this effort, the Transportation Division will develop a set of standards on serviceability, construction, quality, etc.



TESTING OF FIRST-ROUND SUBMISSIONS BY MANUFACTURERS

The participating manufacturers of this study, after receiving and reviewing the residential lighting standard, will submit fixtures they feel will meet the requirements of the standard and the Transportation Division. Orfield Laboratories will assess the fixtures and their recommended placement against the standard. In addition, the Transportation Division will receive the fixtures and plans for their evaluations regarding serviceability, etc. The results of these evaluations will be shared with the individual manufacturers, the Transportation Division and Orfield Laboratories, Inc. Information about one manufacturer's submission will not be shared with the other manufacturers.

PHASE III: FINAL TESTING AND EVALUATIONS

TESTING OF SECOND-ROUND SUBMISSIONS BY MANUFACTURERS

Once the evaluations have been reviewed by the manufacturers of the residential lighting systems, they will be given the opportunity to submit another lighting system for evaluation. These evaluations will be done in the same way as those performed on the first-round submissions.

APPROVAL OF SOME SYSTEMS FOR INSTALLATION TRIALS

Depending on the results of the evaluations, some or all of the lighting systems submitted and evaluated that met the standard will be approved for trial installation for residential lighting for the City of Minneapolis. These approvals will be in written form and countersigned by the Transportation Division, pending participation in the final jury segment below.

FIELD JURY OF NEW INSTALLATIONS,

Each with a different manufacturer's top-ranked system that meets the standard. In this final segment, manufacturers with approved systems supply lighting systems to the City of Minneapolis to cover both sides of one City block at approved spacing. Four to eight (4-8) lights will be in this test, on City-provided poles. These systems will be installed by the City in consecutive parallel blocks within a neighborhood of the City. Orfield Laboratories, Inc. and Transportation Division officials will conduct on-site juries to measure the semantic-differential response of demographically-selected jurors to each of these lighting systems. OL will also make quantitative measurements of the lighting produced on each of the blocks. Final results are shared with the Transportation Division and the participating manufacturers, and final acceptance will then be determined. If the Transportation Division decides to retain these lighting systems, they shall be donated to the City by the manufacturer.

**ADDITIONAL SERVICES (PER PERSON/HOUR)**

1. Meetings, in addition to two meetings at Orfield Laboratories to discuss the project to present the results.
2. The ongoing coordination of contracts and questions related to the design and construction process.
3. The tuning, adjustment and final acceptance of work product on this project.
4. Other non-specified tasks

SCHEDULE

Upon receipt of our signed proposal or a contract authorizing our proposal Phase I of this work will be completed according to the Project Matrix below, or within the client's required time frame as negotiated and agreed upon in writing. Thirty (30) days after the completion of this project, involvement in this project by OL ends. Further involvement will be charged at OL's hourly rate at that time.

Project Matrix -- Preliminary

Phase I	Preliminary Development	1-3
Phase II	Intermediate Testing and Assessment	4-7
Phase III	Final Testing and Evaluations	8-9

Meetings and Major Presentations (Minneapolis/Manufacturer's location) Optional

DELAYS

The proposal is made under the assumption that materials and decisions required of manufacturers and their representatives are delivered in a timely manner. Should delays of more than one week (seven elapsed days) occur while waiting for input from a manufacturer, OL reserves the right to charge a retainer at the rate of \$5000 per month until the required input is obtained. This charge reflects the additional investigation and coordination OL often is called upon to provide during these periods. In addition, these charges help offset the cost of the disruption caused to staff and facilities schedules. Should OL decide to exercise this option, it will inform the manufacturer in writing of its decision.



FEES

All fees are billed as quoted on a flat fee basis, unless otherwise noted. Billings are on 1 month intervals and are due in 30 days. Any services not offered but requested will be quoted for approval. Expenses noted in the following section, reimbursement of expenses, are additional to the fees quoted and are charged including a 12% processing/handling fee. Interest rates on unpaid balances are calculated at the rate of 1% per month on outstanding balances. Any collection costs are the obligation of the client. Billings are due upon completion of monthly contract work. This project is quoted on a set-fee basis as follows:

The fees quoted are based on the assumed participation in this program of at least four lighting manufacturers with a maximum of 2 fixtures per manufacturer and represent a per-manufacturer contribution to the project.

PHASE I \$10,000

Site Visits
Literature & Product Review
Style Jury

PHASE II \$15,000

Field Jury for existing installations
Analysis & assessment
Develop lighting system standard
Test first-round submissions

PHASE III \$10,000

Test second-round submission
Approval of some systems
Field jury of new installations

These fees are paid at the outset of each phase as part of the qualification process.

OPTIONAL SERVICES AT ADDITIONAL COST

- a. Performance of additional studies on above items
- b. Lighting / Daylighting Simulation model(s)
- c. Vendor/Contract Supervision/Coordination
- d. Site (Outdoor) Lighting Design

The quoted fees represent hourly charges, plus laboratory time and Lab facilities. Lab time and testing equipment charges generally are about 20% of total costs.



REIMBURSEMENT OF EXPENSES

All expenses are billed at cost, and are limited to:

- Delivery of plans or correspondence/Postage
- Airline Tickets/Ground transportation
- Overnight accommodations, if required
- Auto expenses @ .50/mile
- Special equipment
- Visualizations and graphics costs for presentation to juries
- Other requested additions and expenses

DOCUMENTS

Our design work requires a set of documents drawn to conventional scale (1/4, 1/8, 1/16) that are available from our client at no cost. The documents must be in the same scale and accompanying specifications must also be easily available. It is assumed that these documents are accurate and this accuracy is the responsibility of the client. Specific documents & information required at the commencement of this project are:

1. Product Engineering Plans
2. Independent Testing Lab Report
3. Photometric Data
4. Installation Information
5. Current major installations near Minneapolis or in the Midwest
6. Optical, light source and lensing options
7. Finish Options
8. Manufacturer Recommendations
9. Other useful information shared by Manufacturers
10. The Transportation Division will provide street plans/lighting layouts for standardized uses

Additional information may be requested as the project proceeds.

DELIVERABLES

At the end of this project, the deliverables will be:

1. Information on the quality of the current lighting systems as determined by the public
2. Information on the quality of the current lighting systems as determined by measurement
3. Lighting Standards and Selected Lighting Types
4. Product measurements
5. Coordination and assistance to the manufacturer in working with Orfield Laboratories on this project.
6. Testing of final lighting systems
7. Acceptance of lighting systems by the Transportation Division as alternatives to participation in competitive bidding for future residential lighting installations.

**DESIGN SERVICES**

The services offered are design services and are not services in the fields of architecture or professional engineering. The field of lighting consulting is not recognized under any professional registration practice. Separate architectural and engineering services are not part of this proposal. Any services needed in those areas related to our work are the specific responsibility of the client and are not offered by Orfield Laboratories, Inc.

GUARANTEES

While services offered are considered to be state of the art in approach, any specific stipulations as to the performance of particular designs must be stated by the client, or no stipulations are assumed to be present. There is no legal liability for work performed as this is an experimental research project. In agreeing to take part in this project, manufacturer accepts this total limit on litigation, arbitration or filing of any legal action. In the case of disagreements, the City and Orfield Laboratories, Inc. will have final say in response to the manufacturer. No claims may be made against Orfield Laboratories. We look forward to the possibility of working with you on this project and we hope that this particular consulting experience will support the view that there are substantial benefits to be derived through the use of specialized consulting services.

PROPOSAL ACCEPTANCE

Steven J. Orfield
Orfield Laboratories, Inc.
June 6, 2002

Authorized Signature
City of Minneapolis
Date: